LL

THE HARMAN KARDON
CSP-1

Manual No. CSP1-1

AUTOMOTIVE SURROUND PREAMPLIFIER

Technical Manual

harman/kardon
8380 Balboa Blvd, Northridge, CA 91325
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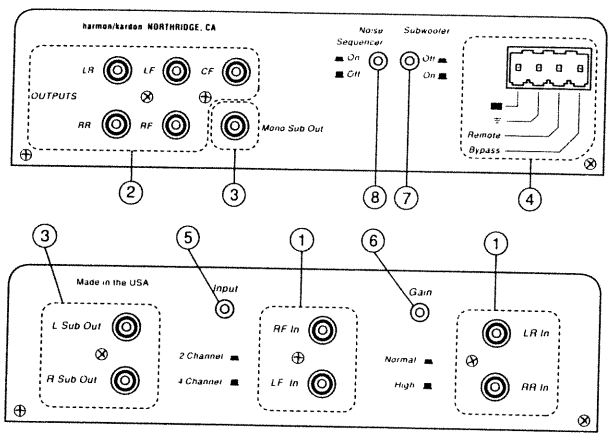
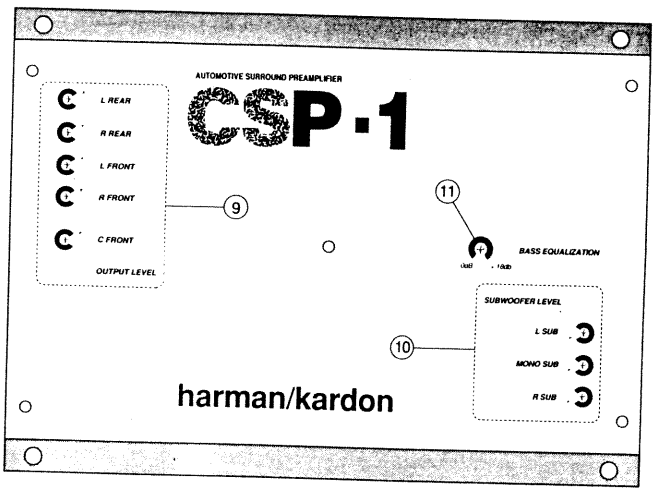
COMPONENTS AND THEIR FUNCTION





(1) Signal Input Connectors
(2) Signal Output Connectors
(3) Subwoofer Output Connectors
(4) Power Input Connector Receptacle
(5) Input Parallel Switch
(6) Gain Selection Switch
(7) Subwoofer Switch
(8) Noise Sequencer Switch
(9) Output Level Adjustment
(10) Subwoofer Level Adjustment
(11) Bass Equalization Adjustment

SPECIFICATIONS

Automotive Surround Preamplifier	CSP-1
Subwoofer Channels Low-Pass Frequencies	*250 Hz, 18 dB/octave rolloff (can be varied from 55 Hz - 300 Hz)
High Channel High-Pass Frequencies	*250 Hz 18, dB/octave rolloff (can be varied from 55 Hz - 300 Hz)
Input/Output Gain	+20 dB (gain switch on High)
Maximum Output Level (0.2% THD)	2 Volts RMS
THD at 2 Volts, 1 kHz	Less than 0.2 %
Frequency Response	10 Hz - 100 kHz ±2 dB (sub-woofer switch in the off position)
Bass Eq	0 to + 18 dB boost @ 45 Hz
Signal to Noise Ratio (A-WTD, 2.0 Volts)	>95 dB
Input Impedance	34 kΩ
Output Impedance	100 Ω
Static Inter-channel Separation	35 dB minimum: typically better than 40 dB
Fuse Size and Type	1.5 amp, Type 3AG Fast Blow
Mechanical Size/Weight	10'/8 "x 7'/8 "x 1'/2"/3 lbs 5 oz

* denotes factory setting

DISASSEMBLY INSTRUCTIONS

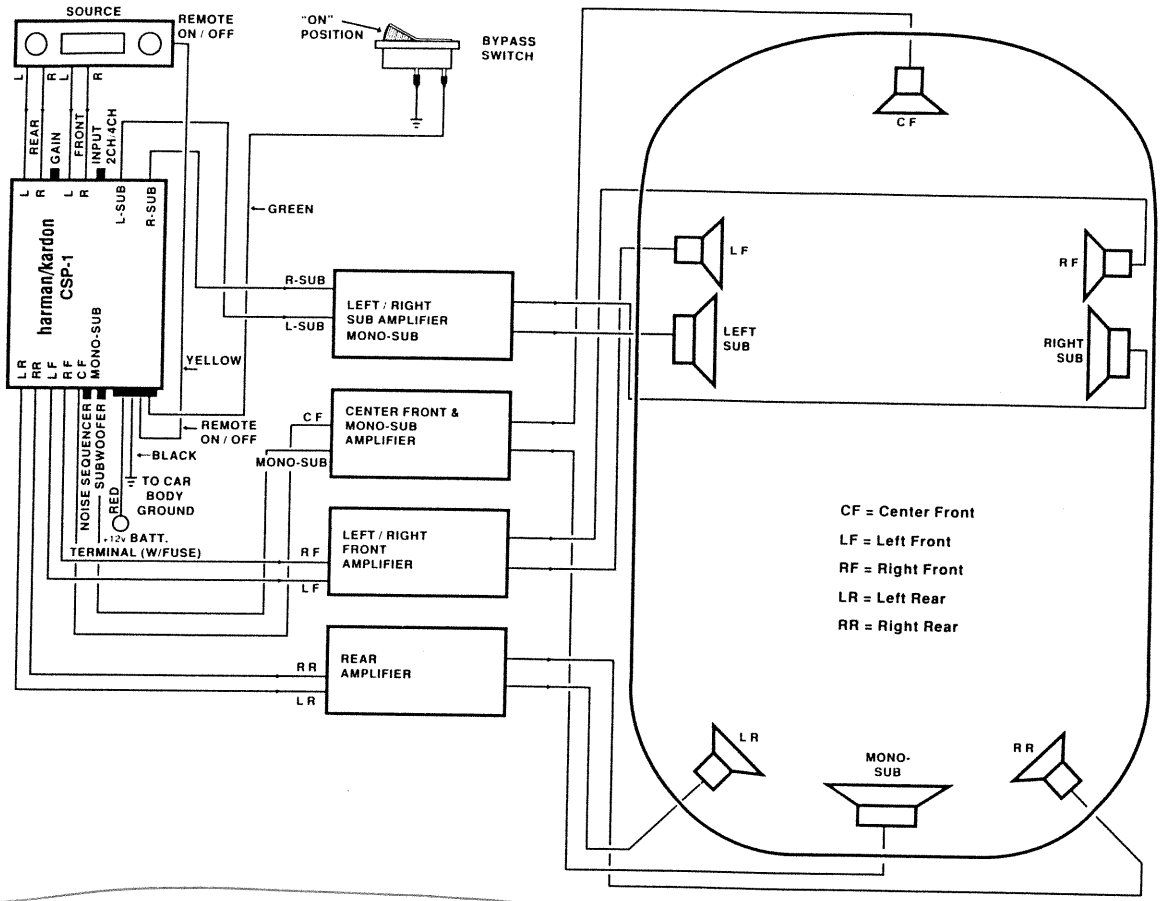
1) Take off the bottom cover of the enclosure by first removing 3 screws from the input signal end plate

2) Then remove 2 screws from the bottom corners of the output signal endplate.

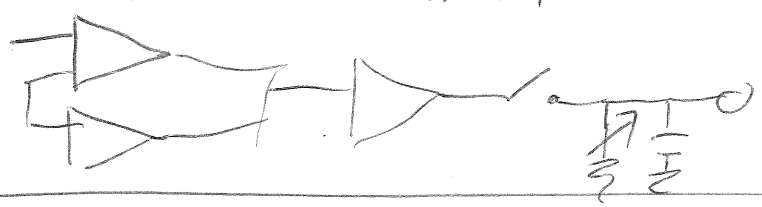
3) Next, remove 3 screws from each blank side of the case. The screws are located toward each end of the panel. There are two extra screws next to each other on the side near the harman/kardon logo that should not be removed.

4) Finally, slide the bottom cover backwards until the endplate clears the input jacks and then lift the cover off.

CONNECTION DIAGRAM

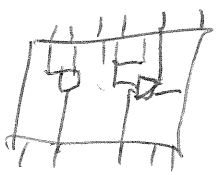


Circuit Block Diagram



Circuit Description

IC Block Diagram



CSP-1 Parts List

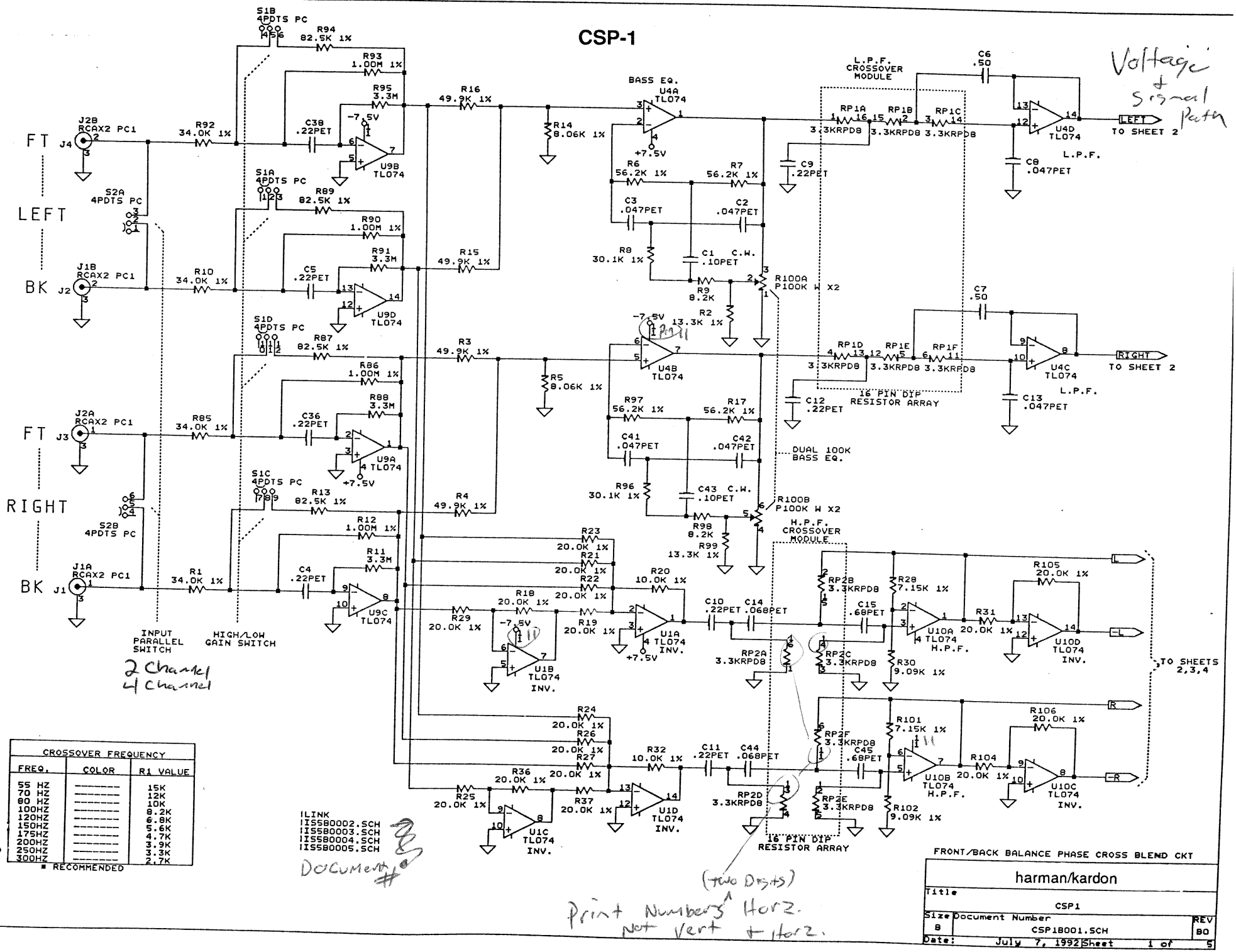
Qty.	Reference Designator	Part	Part #	Part Description
8	C1,C17,C19,C21,C23,C43, C47,C48	.10PET	62-1017	0.10 Box Cap., 10% 100V, 10mm Poly. Film
6	C2,C3,C8,C13,C41,C42	.047PET	62-1013-03	0.047 Box Cap., 10% 100V, 5mm Poly. Film
16	C4,C5,C9,C10,C11,C12,C30, C31,C36,C38,C59,C60,C84, C85,C86,C90	.22PET	62-1019	0.22 Box Cap., 10% 100V, 10mm Poly. Film
2	C6,C7	.50	62-0098	0.50 uF Capacitor 10% 100V Polyester Film
2	C14,C44	.068PET	62-1015	0.068 Box Cap., 10% 100V, 10mm Poly. Film
2	C15,C45	.68PET	62-1025-03	0.68 Box Cap., 10% 100V, 10mm Poly. Film
10	C16,C18,C20,C22,C49,C50, C51,C52,C53,C54	.010PET	62-1008-03	0.010 Box Cap., 10% 100V, 5mm Poly. Film
34	C24,C25,C26,C29,C34,C35, C37,C39,C46,C57,C58,C62, C64,C66,C68,C72,C73,C74, C76,C78,C80,C83,C87,C88, C92,C94,C97,C98,C106, C107,C108,C109,C110,C111	BP	62-0067	0.047 uF Capacitor 20% 50V Axial Monolithic
2	C27,C28	2.2U	60-0072	2.2 uF Capacitor +80%,-20% 50V Electrolytic
5	C32,C33,C61,C63,C91	47PF	62-0019	47 pF Capacitor
1	C40	.0047PET	62-1006-03	0.0047 Box Cap., 10% 100V, 5mm Poly. Film
2	C55,C56	1 NP	60-0046-01	1.0 uF Capacitor +80%,-20% 16V Electrolytic, N.P.
1	C65	25PF	62-0001	25 pF Capacitor 5% 50V Ceramic Disc
2	C67,C89	10U 25V	60-0050-01	10.0 uF Capacitor +80%,-20% 25V Electrolytic
1	C69	180PF	62-0021	180 pF Capacitor 20% 50V Ceramic Disc
8	C75,C77,C79,C93,C95,C96, C100,C103	100U 25V	60-0055-01	100.0 uF Capacitor +80%,-20% 25V Electrolytic
2	C81,C99	1000U 25V	60-0070	1000.0 uF Capacitor +80%,-20% 25V Electrolytic
1	C102	1U	60-0044-01	1.0 uF Capacitor +80%,-20% 50V Electrolytic
1	C104	.10D	62-0030	0.10 uF Capacitor 10% 50V Ceramic Disc
9	D1,D2,D3,D4,D7,D8,D12, D13,D16	1N4148	70-0002	1N4148 Silicon Switching Diode, 75 Volts PIV
1	D5	1N5237B	70-0013	1N5237B Zener Diode 8.2V
4	D6,D9,D10,D15	FR103	70-0080	FR103
3	D11,D17,D18	1N4735	70-0020	1N4735 Zener Diode 6.2V
1	D14	1N4003	70-0007	1N4003 Silicon Rectifier
1	D19	1N5239B	70-0155	1N5239B, Zener Diode 9.1V, 1/2 Watt
1	F1	FUSE1.5A	32-0009	Fuse 1.50 AMP, CAB 250V
1	H1	HDR4_.2	32-0122	4 Pin Header, 0.2" spacing
3	J1,J2,J3	RCAX2 PC1	32-0111	RCA X 2, PCB Mount Jack, Gold
1	J4	RCAX6 PC1	32-0112	RCA X 6, PCB Mount Jack, Gold
1	L1	GAVTOR	26-0030	
2	L2,L3	FBEAD	42-1000	Ferrite Bead
4	Q1,Q2,Q3,Q4	2N5951	70-1070	2N5951 N-Channel JFET
2	Q5,Q6	MJE15028	70-1048	MJE15028 NPM High Volt. Transistor
1	Q7	2N3906	70-1006	2N3906 PNP Gen. Purp. Amplifier/Switching Transistor
1	Q8	2N3904	70-1004	
4	R1,R10,R85,R92	34.0K 1%	52-0081-01	34.0 KOhm Resistor 1% 1/4 Watt Metal Film
2	R2,R99	13.3K 1%	52-0053-01	13.3 KOhm Resistor 1% 1/4 Watt Metal Film
17	R3,R4,R15,R16,R67,R71, R72,R73,R119,R120,R123, R124,R133,R147,R223,R231, R241	49.9K 1%	52-0020-01	49.9 KOhm Resistor 1% 1/4 Watt Metal Film

CSP-1 Parts List

Qty.	Reference Designator	Part	Part #	Part Description
2	R5,R14	8.06K 1%	52-0111-01	8.06 KOhm Resistor 1% 1/4 Watt Metal Film
6	R6,R7,R17,R39,R40,R97	56.2K 1%	52-0065-01	56.2 KOhm Resistor 1% 1/4 Watt Metal Film
2	R8,R96	30.1K 1%	52-0083-01	30.1 KOhm Resistor 1% 1/4 Watt Metal Film
4	R9,R98,R196,R197	8.2K	50-0222-01	8.2 KOhm Resistor 5% 1/4 Watt Carbon Film
12	R11,R75,R79,R82,R88,R91, R95,R142,R190,R192,R194, R203	3.3M	50-0049-01	3.3 MOhm Resistor 5% 1/4 Watt Carbon Film
5	R12,R86,R90,R93,R140	1.00M 1%	52-0705-01	1.00 MOhm Resistor 1% 1/4 Watt Metal Film
4	R13,R87,R89,R94	82.5K 1%	52-0006-01	82.5 KOhm Resistor 1% 1/4 Watt Metal Film
35	R18,R19,R21,R22,R23,R24, R25,R26,R27,R29,R31,R33, R34,R35,R36,R37,R38,R56, R57,R104,R105,R106,R152, R153,R163,R164,R165,R177, R205,R206,R217,R218,R219, R232,R240	20.0K 1%	52-0091	20.0 KOhm Resistor 1% 1/4 Watt Metal Film
3	R20,R32,R239	10.0K 1%	52-0107	10.0 KOhm Resistor 1% 1/4 Watt Metal Film
2	R28,R101	7.15K 1%	52-0113-01	7.15 KOhm Resistor 1% 1/4 Watt Metal Film
2	R30,R102	9.09K 1%	52-0109-01	9.09 KOhm Resistor 1% 1/4 Watt Metal Film
5	R41,R42,R46,R47,R131	121K 1%	52-0297-01	121 KOhm Resistor 1% 1/4 Watt Metal Film
8	R43,R44,R48,R50,R51,R59, R64,R66	169K 1%	52-0283-01	169 KOhm Resistor 1% 1/4 Watt Metal Film
2	R45,R63	60.4K 1%	52-0073-01	60.4 KOhm Resistor 1% 1/4 Watt Metal Film
4	R49,R61,R127,R244	69.8K 1%	52-0012-01	69.6 KOhm Resistor 1% 1/4 Watt Metal Film
6	R52,R53,R107,R111,R113, R114	3.01K 1%	52-0125-01	3.01 KOhm Resistor 1% 1/4 Watt Metal Film
2	R54,R55	10M	50-0060-01	10M MOhm Resistor 5% 1/4 Watt Carbon Film
5	R58,R60,R62,R65,R238	442K 1%	52-0243-01	442 KOhm Resistor 1% 1/4 Watt Metal Film
2	R69,R78	162K 1%	52-0285-01	162 KOhm Resistor 1% 1/4 Watt Metal Film
4	R70,R144,R176,R179	TP50K H	42-0222	50 kOhm Trim Pot, Horizontal Mount, 3/4 turn
9	R76,R80,R83,R135,R138, R143,R189,R191,R193	100	50-0003	100 Ohm Resistor 5% 1/4 Watt Carbon Film
8	R77,R81,R84.R136,R137, R139,R187,R188	TP25K H	40-0271	25 kOhm Trim Pot, Horizontal Mount, 3/4 turn
1	R100	P100K W X2	40-2011	100 KOhm "W" Taper Potentiometer, x2, Rack Leads
4	R103,R169,R204,R224	105K 1%	52-0303-01	105 KOhm Resistor 1% 1/4 Watt Metal Film
4	R108,R109,R110,R112	6.04K 1%	52-0115-01	6.04 KOhm Resistor 1% 1/4 Watt Metal Film
6	R115,R117,R155,R166,R208, R221	24.9K 1%	52-0039-01	24.9 KOhm Resistor 1% 1/4 Watt Metal Film
14	R116,R118,R128,R129,R130, R132,R157,R171,R199,R200, R201,R211,R227,R245	100K 1%	52-0305-01	100 KOhm Resistor 1% 1/4 Watt Metal Film
4	R121,R122,R125,R126	200K 1%	52-0276-01	200 KOhm Resistor 1% 1/4 Watt Metal Film
1	R134	2M	50-0046	2 MOhm Resistor 5% 1/4 Watt Carbon Film
1	R141	4.7K	50-0015	4.7 KOhm Resistor 5% 1/4 Watt Carbon Film
2	R145,R146	0	50-0050	0 Ohm Resistor 5% 1/4 Watt Carbon Film
1	R148	604K 1%	52-0230-01	604 KOhm Resistor 1% 1/4 Watt Metal Film
4	R151,R168,R209,R222	TP10K H	42-0211	10 KOhm Trim Pot, Horizontal Mount, 3/4 turn
4	R154,R167,R207,R220	28.7K 1%	52-0084-01	28.7 KOhm Resistor 1% 1/4 Watt Metal Film
4	R156,R170,R210,R226	39.2K 1%	52-0079-01	39.2 KOhm Resistor 1% 1/4 Watt Metal Film
4	R158,R172,R212,R225	1.50K 1%	52-0144-01	1.50 KOhm Resistor 1% 1/4 Watt Metal Film
4	R160,R175,R213,R228	TP200 H	42-0203	200 Ohm Trim Pot, Horizontal Mount

CSP-1 Parts List

Qty.	Reference Designator	Part	Part #	Part Description
4	R161,R173,R214,R229	21.0K 1%	52-0042-01	21.0 KOhm Resistor 1% 1/4 Watt Metal Film
4	R162,R174,R215,R230	6.81K 1%	52-0157-01	6.81 KOhm Resistor 1% 1/4 Watt Metal Film
2	R181,R233	560	50-0193-01	560 Ohm Resistor 5% 1/4 Watt Carbon Film
4	R183,R184,R185,R186	6.8K	50-0016	6.8 KOhm Resistor 5% 1/4 Watt Carbon Film
2	R195,R198	6.2K	50-0219-01	6.2 KOhm Resistor 5% 1/4 Watt Carbon Film
1	R216	27K	50-0027	27 KOhm Resistor 5% 1/4 Watt Carbon Film
1	R235	390	50-0189-01	390 Ohm Resistor 5% 1/4 Watt Carbon Film
1	R237	76.8K 1%	52-0008-01	76.8 KOhm Resistor 1% 1/4 Watt Metal Film
1	R242	4.7M	50-0291-01	4.7 MOhm Resistor 5% 1/4 Watt Carbon Film
1	R246	10 1/2	50-5150-01	10 Ohm Resistor 5% 1/2 Watt Carbon Film
2	RP1,RP2	3.3KRPD8	54-0394	16 Pin Dip, Resistor Network, 3.3 kOhm 2%
2	RP3,RP4	20KRP4	54-0369	4 Element Resistor Network, 20 kOhm 2%
4	S1,S2,S3,S4	4PDTS PC	44-0026	4 Pole Double Throw I/O Switch (small), PC Mount
4	TP1,TP2,TP3,TP4	HDR1	32-1050	1 Pin Header
12	U1,U2,U4,U8,U9,U10,U12, U13,U14,U15,U17,U18	TL074	72-4021	Quad JFet-Input Op-Amp
3	U3,U7,U11	4066	72-0037	CD4066, MC14066 Quad Bilateral Analog Switch
2	U5,U6	SLIC-1		
1	U16	4017A	72-0035	Decade Counter



CROSSOVER FREQUENCY		
FREQ.	COLOR	R1 VALUE
55 HZ	———	15K
70 HZ	———	12K
80 HZ	———	10K
100HZ	———	8.2K
120HZ	———	6.8K
150HZ	———	5.6K
175HZ	———	4.7K
200HZ	———	3.9K
250HZ	———	3.3K
300HZ	———	2.7K

■ RECOMMENDED

!LINK
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!IS5B0004.SCH
!IS5B0005.SCH

Document #

(two Digits)

Print Numbers Horz. Not Vert + Horz.

FRONT/BACK BALANCE PHASE CROSS BLEND CKT

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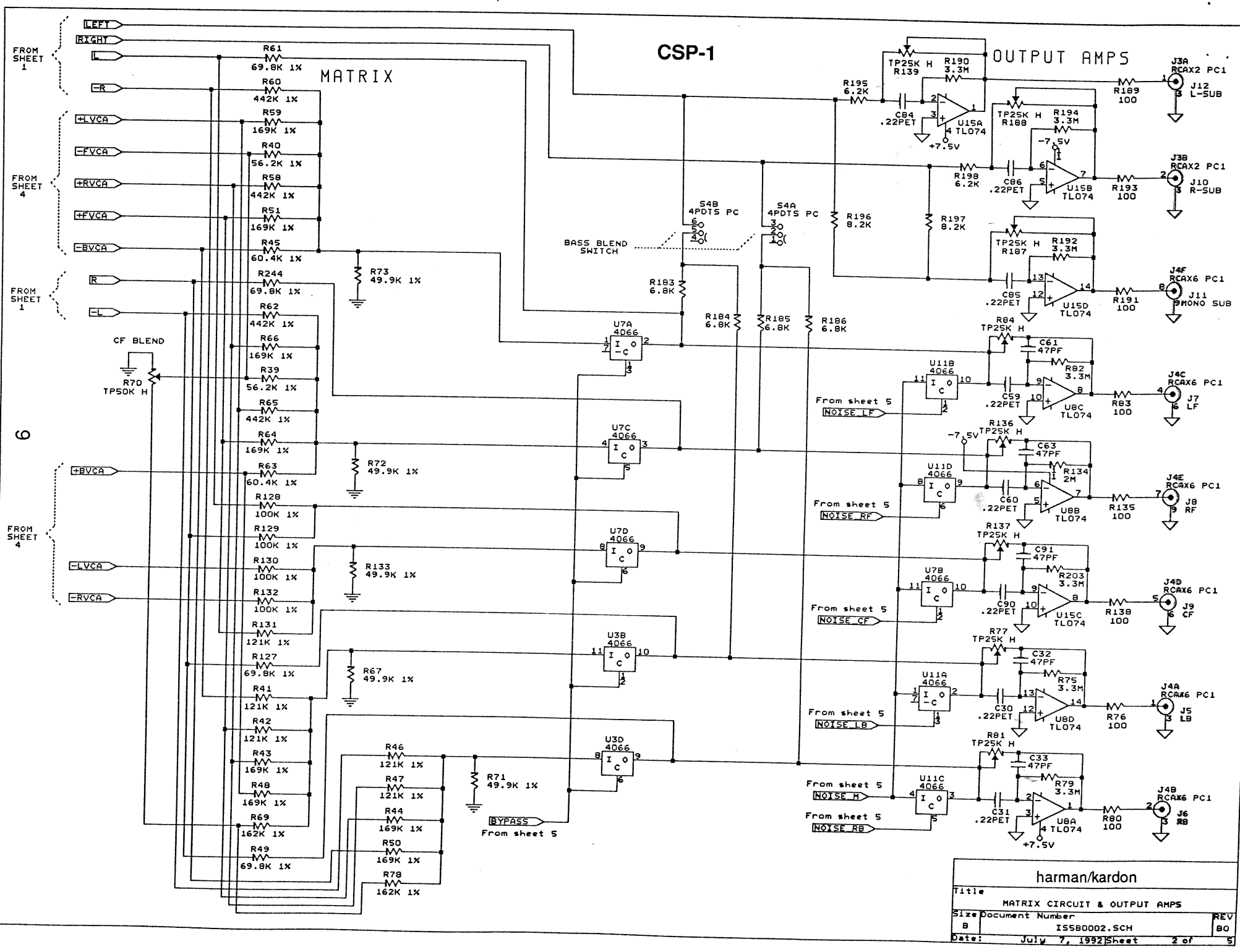
CSP-1
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OUTPUT AMPS
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FROM SHEET 4
FROM SHEET 1
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R61 69.8K 1%
R60 442K 1%
R59 169K 1%
R40 56.2K 1%
R58 442K 1%
R51 169K 1%
R45 60.4K 1%
R244 69.8K 1%
R62 442K 1%
R66 169K 1%
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R132 100K 1%
R131 121K 1%
R127 69.8K 1%
R41 121K 1%
R42 121K 1%
R43 169K 1%
R48 169K 1%
R69 162K 1%
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R50 169K 1%
R78 162K 1%
R73 49.9K 1%
R72 49.9K 1%
R133 49.9K 1%
R67 49.9K 1%
R71 49.9K 1%
CF BLEND
R70 TP50K H
BASS BLEND SWITCH
S4B 4PDTS PC
S4A 4PDTS PC
R183 6.8K
R184 6.8K
R185 6.8K
R186 6.8K
R196 8.2K
R197 8.2K
U7A 4066
U7C 4066
U7D 4066
U3B 4066
U3D 4066
BYPASS
From sheet 5
R195 6.2K
TP25K H R139
R190 3.3M
C84 .22PET
U15A TL074
+7.5V
R189 100
J3A RCAX2 PC1
J12 L-SUB
TP25K H R188
R194 3.3M
-7.5V
R198 6.2K
C86 .22PET
U15B TL074
R193 100
J3B RCAX2 PC1
J10 R-SUB
TP25K H R187
R192 3.3M
C85 .22PET
U15D TL074
R191 100
J4F RCAX6 PC1
J11 MONO SUB
R84 TP25K H
C61 47PF
R82 3.3M
C59 .22PET
U8C TL074
R83 100
J4C RCAX6 PC1
J7 LF
U11B 4066
From sheet 5
NOISE_LF
R136 TP25K H
C63 47PF
R134 2M
C60 .22PET
U8B TL074
R135 100
J4E RCAX6 PC1
J8 RF
U11D 4066
From sheet 5
NOISE_RF
R137 TP25K H
C91 47PF
R203 3.3M
C90 .22PET
U15C TL074
R138 100
J4D RCAX6 PC1
J9 CF
U7B 4066
From sheet 5
NOISE_CF
R77 TP25K H
C32 47PF
R75 3.3M
C30 .22PET
U8D TL074
R76 100
J4A RCAX6 PC1
J5 LB
U11A 4066
From sheet 5
NOISE_LB
R81 TP25K H
C33 47PF
R79 3.3M
C31 .22PET
U8A TL074
+7.5V
R80 100
J4B RCAX6 PC1
J6 RB
U11C 4066
From sheet 5
NOISE_M
From sheet 5
NOISE_RB
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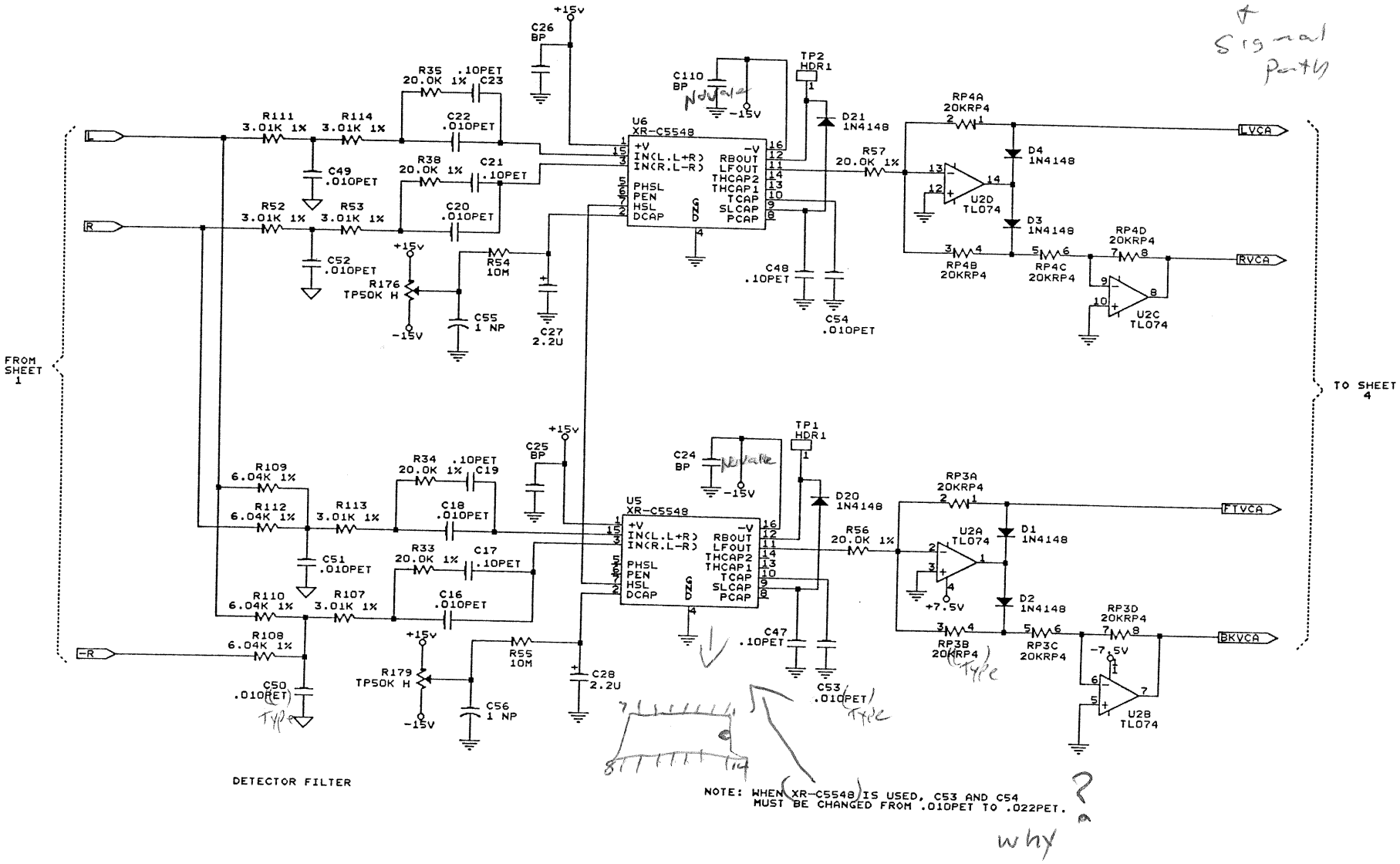

Voltage & Signal Parts

10

harman/kardon		
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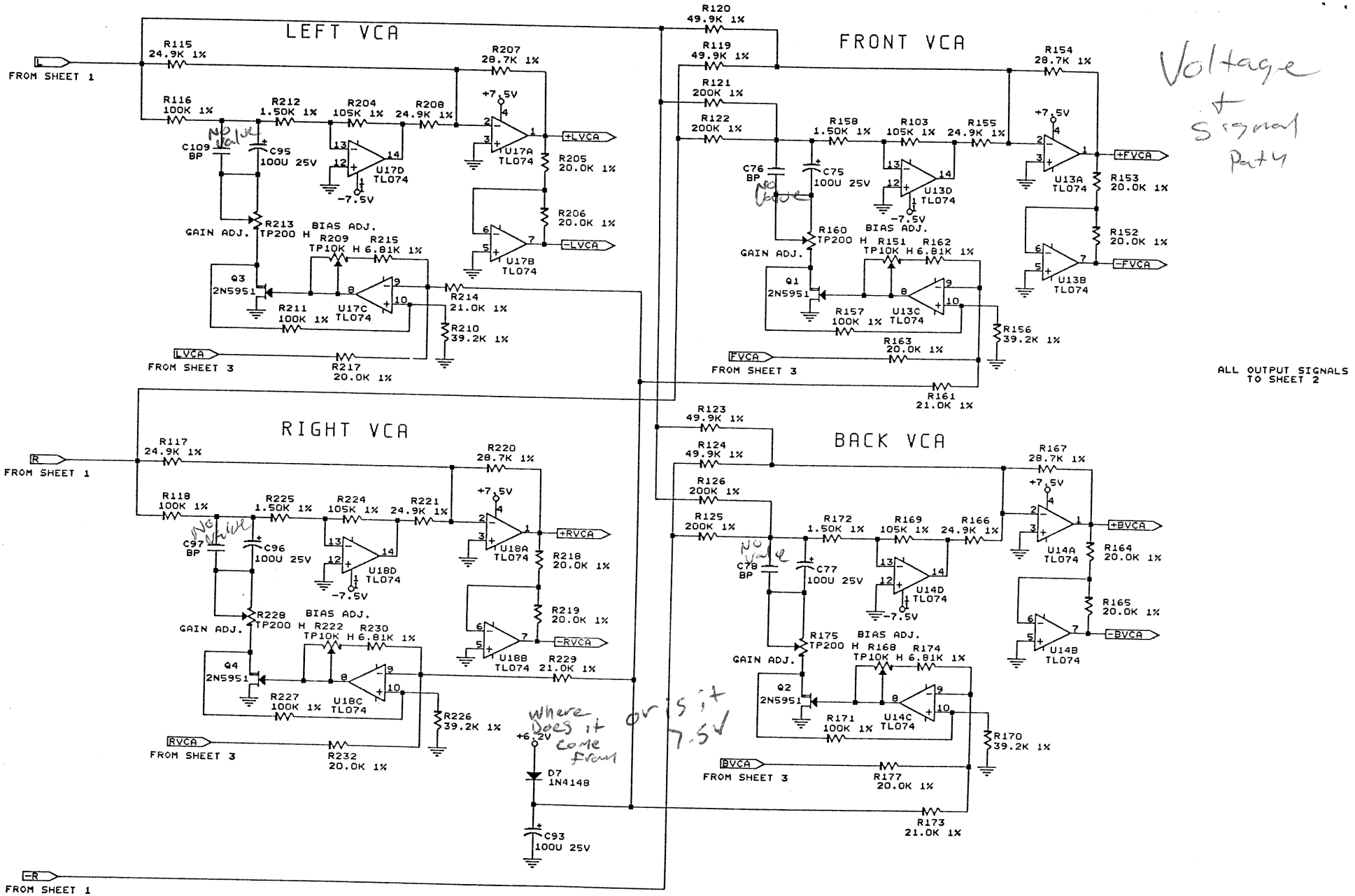

harman/kardon	
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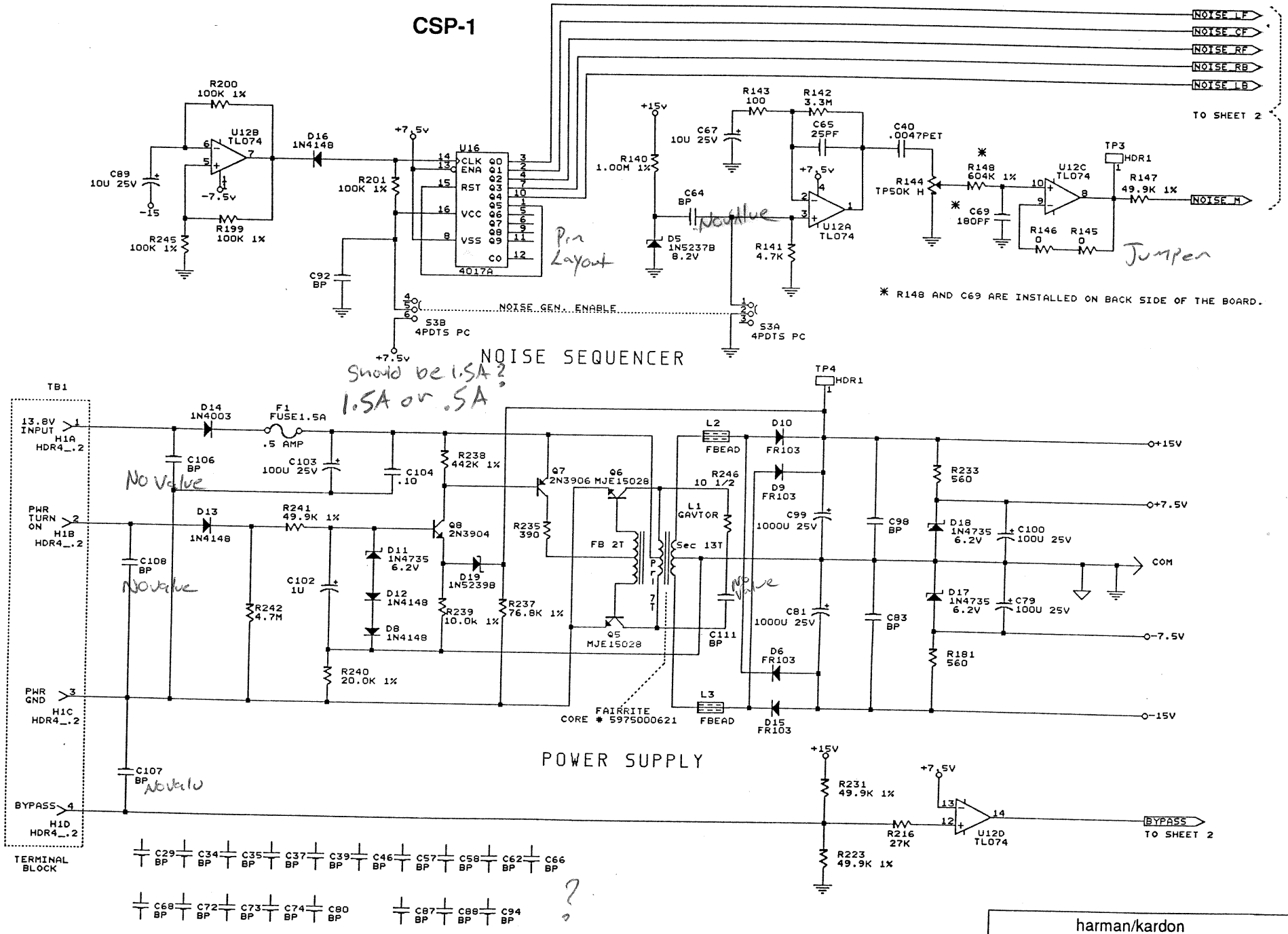

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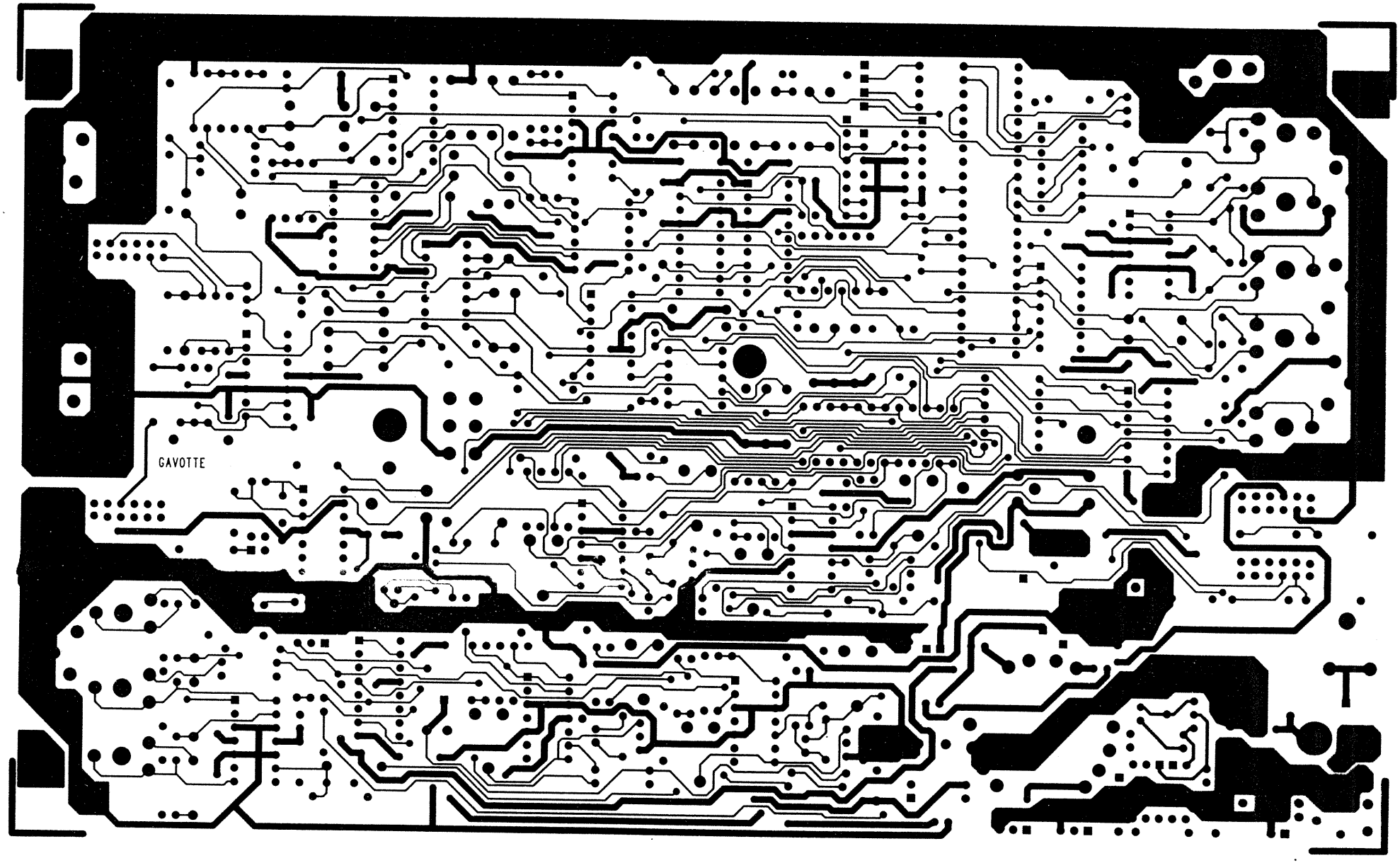
CSP-1

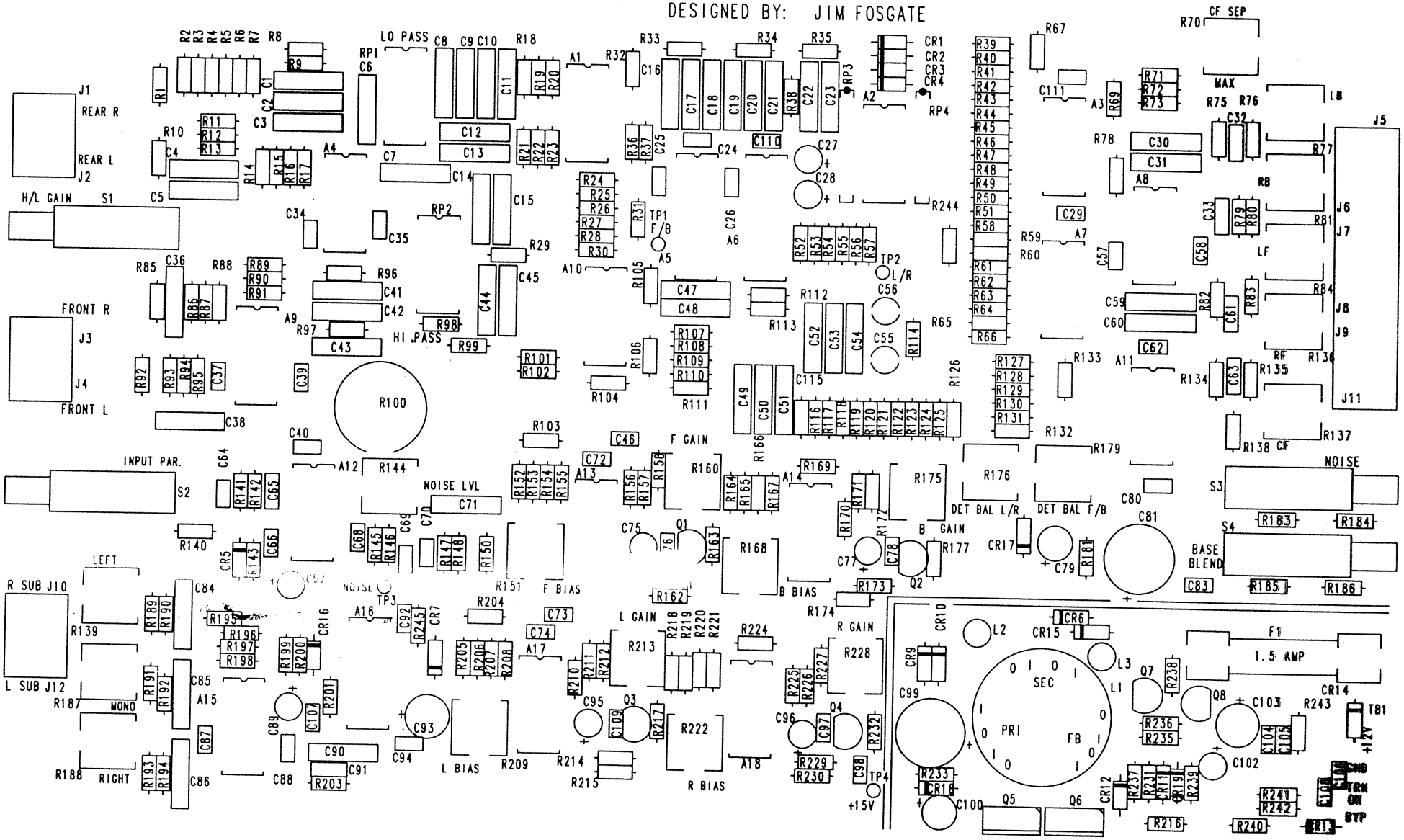
BOARD AS VIEWED FROM COMPONENTS SIDE



WIRING DIAGRAM

CSP-1

COMPONENT LOCATION AS VIEWED FROM COMPONENTS SIDE



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BOARD AS VIEWED FROM SOLDER SIDE